REMARKS

Applicants are amending their claims in order to further clarify the definition of various aspects of the present invention, so as to facilitate proceedings and simplify issues in connection with the subject matter claimed in the above-identified application. Specifically, Applicants are incorporating the subject matter of each of claims 4, 6 and 11 into claim 1. Correspondingly, Applicants are cancelling claims 3, 4, 6, 11, 16-19 and 22 without prejudice or disclaimer, and have amended dependency of claims 5 and 7 (each to be dependent on claim 1).

Initially, it is respectfully requested that the present amendments be entered. Noting that the present amendments incorporate subject matter of previously considered dependent claims into independent claim 1, it is respectfully submitted that the present amendments do not raise any new issues, including any issue of new matter; and, moreover, simplify issues remaining in connection with the above-identified application. Noting further contentions by the Examiner in the Office Action mailed October 29, 2008, it is respectfully submitted that the present amendments are timely.

In view of the foregoing, it is respectfully submitted that Applicants have made the necessary showing under 37 CFR 1.116(b); and that, accordingly, entry of the present amendments is clearly proper.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the reference applied by the Examiner in rejecting claims in the Office Action mailed October 29, 2008, that is, the teachings of U.S. Patent No. 5,637,365 to Carlblom, under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that the teachings of the applied reference would have neither disclosed nor would have suggested such a gas-barrier container as in the present claims, having at least one gas-barrier layer made of an epoxy resin cured product that is formed by curing an epoxy resin composition consisting essentially of an epoxy resin and an epoxy resin-curing agent, and (a) containing a skeletal structure represented by the formula (1) in claim 1 in an amount of 45% by weight or higher, and (b) wherein a blending ratio between the epoxy resin and the epoxy resin-curing agent in the epoxy resin contained in the gas-barrier layer is controlled such that an equivalent ratio of active hydrogen in the curing agent to epoxy groups in the epoxy resin is in a range of 1.5 to 3.0, the gas-barrier layer having an oxygen permeability as set forth in claim 1. See claim 1.

As discussed in more detail infra, it is respectfully submitted that the applied reference, Carlblom, discloses a gas-barrier coating wherein the amount of amine needs to be rendered low in order to reduce oxygen permeability and reduce the yellowing of the coating layer. That is, and as illustrated in claims 1 and 14 of Carlblom, the amount of amine is 7 wt.% or less in the whole barrier layer (in the case of xylylenediamine, 34 wt.% or less), preferably 4 wt.% or less (in the case of xylylenediamine, 19 wt.% or less). Thus, it is respectfully submitted that the disclosure in Carlblom would have taught away from the presently claimed structure, including the gas-barrier layer made of an epoxy resin cured product containing a skeletal structure represented by the formula (1) in an amount of at least 45% by weight.

Moreover, as also discussed in more detail infra, it is respectfully submitted that Carlblom does not disclose, nor would have suggested, such container as in the present claims, wherein an equivalent ratio of active hydrogen atoms in the epoxy

resin-curing agent to epoxy groups in the epoxy resin is in the range of 1.5 to 3.0. When used in laminated containers (note especially claims 8 and 13, and claims dependent thereon), if the equivalent ratio of active hydrogen atoms to epoxy groups is less than 1.5, the resultant gas-barrier material shows a too high crosslinking density, and, therefore, tends to suffer from cracks or rupture upon thermoforming, resulting in poor gas-barrier properties. If the equivalent ratio of active hydrogen atoms to epoxy groups exceeds 3.0, the resultant gas-barrier material shows a too low crosslinking density and tends to be deteriorated in adhesion to a flexible polymer layer, as well as being deteriorated in gas-barrier properties. Note page 15, lines 11-29, of Applicants' specification.

Furthermore, it is respectfully submitted that Carlblom would have neither taught nor would have suggested such gas-barrier container as in the present claims, having features as discussed previously in connection with claim 1, and, additionally, wherein the container has further features as set forth in the dependent claims in the application, such as further definition of amount of skeletal structure presented by the formula (1) contained in the epoxy resin cured product of the gas barrier layer, i.e., an amount of 50% or higher, as in claim 21; and/or wherein the epoxy resin contains, as a main component, the epoxy resin containing glycidylamine moieties derived from m-xylylenediamine as in claim 5; and/or the further definition of the epoxy resin-curing agent as in claim 12; and/or wherein the container is produced by forming a gas-barrier laminated film or sheet containing at least one flexible polymer layer and at least one gas-barrier layer as in claim 8, with the flexible polymer layer being defined as in claims 9 and 10, and note also claim 14; and/or wherein the container is in the form of a hollow container, with 60-

100% of a surface area of at least one of the inner and outer surfaces of the container being coated with the gas-barrier layer (note claim 13).

The present invention is directed to gas-barrier containers, suitably used for purposes of receiving and preserving fruits, beverages, drugs, etc.

In recent years, as packaging materials for receiving and preserving contents, plastic films or containers have been predominantly used due to transparency, light weight and economical advantages thereof.

Recently, as containers for foods or beverages, hollow containers mainly made of polymers have been increasingly employed instead of conventional glass or metallic containers; however, the hollow containers mainly made of polymers are deteriorated in barrier properties to oxygen or carbon dioxide as compared to those made of glass or metals, and are unsuitable for preserving foods or beverages therein for a long period of time.

In view thereof, there have been proposed and practically used, hollow containers having a multi-layer structure including a layer made of a gas-barrier resin such as polyamide. However, production of the multi-layer hollow containers inevitably requires the use of a molding machine having a complicated structure, and it has been demanded to develop gas-barrier hollow containers that can be produced more simply.

There have also been known hollow containers mainly made of polymers, which have been coated with polyvinylidene chloride resins. However, since the resins contain halogen atoms, the formed containers suffer from problem such as environmental pollution or generation of harmful gases such a dioxin upon incineration thereof.

It has also been proposed to form a thin film of carbon or silica on inner surfaces of a stretch blow-molded hollow container made of polyester. However, this requires processing under high vacuum conditions, and inevitably requires use of large-scale apparatuses.

Thus, it is still desired to provide a container having gas-barrier properties whereby materials, such as fruits or beverages, can be preserved for a long period of time in the container, even under high-humidity conditions, and which can be produced by simple processing.

In view of the foregoing, and as a result of extensive research by the present inventors, the present inventors have found that when the container includes a gas-barrier layer made of an epoxy resin cured product that is formed by curing an epoxy resin composition consisting essentially of an epoxy resin and an epoxy resin-curing agent, (a) which cured product contains the skeletal structure represented by formula (1) in claim 1 <u>in an amount of at least 45% by weight</u>, and (b) wherein a blending ratio of active hydrogen in the epoxy resin-curing agent to epoxy groups in the epoxy resin is <u>1.5 to 3.0</u>, the resultant container is excellent in not only a gas-barrier property, but also various other properties such as transparency, retorting resistance, impact resistance, and adhesion to other layers of the container, and such container (including the gas-barrier layer of the cured product) can be formed by relatively simple processing. Moreover, by utilizing such gas-barrier layer for the gas-barrier container as in the present claims, and wherein the gas-barrier layer has an oxygen permeability as in all of the present claims, objectives according to the present invention are achieved. That is, the gas-barrier container is less of a burden on the environment, due to use of non-halogen gas-barrier materials, and is excellent in economical efficiency and workability in production processes in forming

such container. The gas-barrier container according to the present invention exhibits an extremely good gas-barrier property and is excellent in various properties such as interlaminar adhesion strength, gas-barrier properties under a high-humidity condition, impact resistance and retorting resistance. Note page 15, lines 11-28, and pages 37 and 38, of Applicants' specification.

It is emphasized that in the container of the present invention, the at least one gas-barrier layer is made of an epoxy resin cured product that contains a skeletal structure represented by the formula (1) in claim 1 in an amount of 45% by weight or higher. Such gas-barrier layer has improved (that is, reduced) oxygen transmission rate. This can be seen in Table 2 of the specification of the above-identified application, set forth on page 36 of Applicants' specification. Thus, note that in Example 10, described on page 34 of Applicants' specification, the content of the skeletal structure represented by the formula (1) in the epoxy resin cured product was 39.8% by weight, outside the scope of the present claims. In comparison, attention is respectfully directed to Examples 5-9 described on pages 32-34 of Applicants' specification, having a content of the skeletal structure represented by the formula (1) in the epoxy resin cured product of at least 56.5% by weight, within the scope of the present claims. As seen in Table 2 on page 36 of Applicants' specification, the oxygen transmission rate in connection with Example 10 was greater than that in each of Examples 5-9. That is, it is respectfully submitted that these Examples show an unexpectedly better (reduced) oxygen transmission rate for structure having an epoxy resin cured product containing the specified skeletal structure in an amount within the scope of the present claims, as compared to that outside the scope of the present claims. This evidence shows unexpectedly better results achieved according to the present invention. It is respectfully submitted that

this evidence in Applicants' specification must be considered in determining patentability. See In re DeBlauwe, 222 USPQ 191 (CAFC 1984).

While Applicants have previously relied on evidence in their specification for establishing patentability of the presently claimed subject matter, the Examiner has failed to comment on this evidence. Note, for example, the sole full paragraph on page 12 of the previous Amendment filed July 29, 2008; note that the Examiner has not commented on such evidence in the Office Action mailed October 29, 2008. Such failure by the Examiner to comment on evidence of unexpectedly better results in Applicants' specification is clearly improper. Note Manual of Patent Examining Procedure (MPEP) 716.01(a). Such failure by the Examiner to comment on this evidence, particularly in light of the unexpectedly better results shown by this evidence, and also noting, as discussed infra, that Carlblom would not have anticipated the presently claimed subject matter, constitutes clear error which forms a basis for reversal of the rejection by the Examiner.

Furthermore, it is respectfully submitted that in Carlblom, the barrier coating comprises a reaction product of a polyamine with a polyepoxide at a ratio of active amine hydrogen to epoxy group from between 1.3:1 to less than 1.5:1, outside the scope of the blending ratio between the epoxy resin and epoxy resin-curing agent as in the present claims.

Carlblom discloses resins having gas barrier properties, curable barrier coating compositions utilizing these resins, and packaging materials and/or containers including the barrier coatings. The coatings disclosed in this patent are the cured reaction product of a polyamine with a polyepoxide having a specified structure as set forth in column 2, line 40, of this patent. Note, in general, column 2, lines 34-45. This patent discloses that the coatings described therein have

exceptionally low oxygen permeability at amine hydrogen to epoxy equivalent cure ratios lower than 1.5 to 1, and that the amine nitrogen content of these cured coatings may be less than 7%, with good results being attainable as low as 4% or lower, the relatively lower amine content generally having the advantage of less yellowing of the coating over time. See column 2, lines 25-33. Note also column 2, lines 46-60. This patent goes on to describe that preferred polyamines for reacting with the polyepoxides for curing the coatings are aromatic-containing polyamines having groups of the type > NRΦRN <, where R is alkyl containing 1 or 2 carbons, and Φ is phenylene or naphthylene. See column 2, lines 61-65. Note also column 3, lines 1-6. Note, further, column 4, lines 1-10, disclosing a packaging material including at least one layer of a relatively gas-permeable polymeric layer and at least one layer of a polyamine-polyepoxide barrier coating. See, also, column 6, lines 38-52. Note, further, column 10, lines 18-26.

It is emphasized that according to Carlblom, the amine nitrogen content is to be kept low, e.g., less than 7%, which generally has the advantage of less yellowing of the coating over time. It is respectfully submitted that such disclosure as in Carlblom would have neither taught nor would have suggested, and in fact would have taught away from, the presently claimed subject matter, including wherein the epoxy resin cured product contains a skeletal structure represented by the formula (1) in an amount of 45% or higher.

In the paragraph bridging pages 4 and 5 of the Office Action mailed October 29, 2008, the Examiner contends that in Carlblom the skeletal structure represented by the formula (1) in the present claims comprises at least 65% of the curing agent, the Examiner referring to column 8, lines 51-67, of Carlblom. However, note that in column 8, lines 59-65, Carlblom describes that cured networks contain a

combination of specific groups comprising the at least 65%. That is, the combination of the listed three groups comprise at least 65%; it is respectfully submitted that Carlblom is silent regarding the amount of skeletal structure represented by the formula (1) in present claim 1, in the cured structure of Carlblom.

For example, if xylylenediamine (> N-CH_2-Φ-CH_2-N<) is employed in Carlblom, in connection with the aforementioned disclosure in column 8, lines 59-65, of Carlblom, with an amount of amine being 7 wt.% or less in the whole barrier layer, as described in column 2, lines 27-29, of Carlblom, the amount of xylylenediamine would be 34 wt.% or less, so the skeletal structure represented by the formula (1) in the epoxy resin cured product would be 34 wt.% or less. As seen in the foregoing, it is respectfully submitted that Carlblom would have taught away from the subject matter of the present claims, including, inter alia, wherein the epoxy resin cured product contains a skeletal structure represented by the formula (1) in an amount of 45% by weight or higher.

It is emphasized that in Carlblom, the amount of amine needs to be low in order to lower oxygen permeability and reduce yellowing of the coating layer. That is, as can be seen in claims 1 and 14 of Carlblom, the amount of amine nitrogen content is 7 wt% or less of the whole barrier layer (in case of xylylenediamine (XDA), 34 wt% or less), and at least 4 wt% (in case of XDA, at least 19 wt%); that is, between 19 wt% and 34 wt%.

That is, XDA (a skeletal structure represented by the present formula (1)) content is calculated by the following:

Molecular weight of XDA: 136 g, weight of nitrogen in XDA: 28 g

Weight ratio of nitrogen in XDA: [(28 x 100)/136] = 20.6 wt.%

In a case where the nitrogen content is 7 wt.%, the XDA's weight % is

(0.07 x 100)/0.026 = 33.98 wt.% = 34 wt.%

According to TABLE 1 of the Examples of Carlblom, in columns 14 and 15 thereof, the content of a skeletal structure represented by the formula (1) [= XDA] in the Examples of Carlblom is calculated by a weight ratio of nitrogen (N %) value contained in XDA, and is shown in the following:

Example	Amine	Epoxy	N %	Content of the formula (1) %
1	Adduct A*1	HELOXY 69	5.9	0
2	Adduct B	HELOXY 69	4.8	23.3
3	Gaskamine 328*2	HELOXY 69	5.1	24.8
4	Gaskamine 328*2	EPON 828	3.9	18.9
5	MXDA	HELOXY 69	5.2	25.2
6	MXDA	HELOXY 67	5.3	25.7
7	Adduct B	EPI-REZ A-100	4.2	20.4
8	Adduct B	HELOXY 67	4.8	23.3

*1: Adduct A does not contain XDA.

*2: Gaskamine 328 contains XDA in an amount of 25-30 wt.%.

As just described, the content of a skeletal structure represented by the formula (1) is 18.9-25.7 wt.% in the Examples of Carlblom, and it is respectfully submitted that Carlblom would have taught away from including at least 45% by weight, much less at least 65% by weight, of the formula (1) in present claim 1, as the Examiner has contended.

At the very least, the evidence of record in Applicants' specification, discussed supra, establishes unexpectedly better results in reduced oxygen transmission for the present invention, including amount of skeletal structure of formula (1) as in the present claims, establishing unobviousness of the presently claimed invention.

In view of the foregoing comments and amendments, entry of the present amendments, and reconsideration and allowance of all claims presently pending in the above-identified application, are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Kindly charge any shortage of fees due in connection with the filing of this paper, including any extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (case 396.44491X00), and please credit any overpayments to such Deposit Account.

Respectfully submitted,

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